International University of Africa,

Deanship of Postgraduate Studies,

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Department of Educational Technology

DESIGN AND IMPLEMENTATION OF INFORMATION PROCESSING MODEL OF SCIENCE AND TECHNOLOGY EDUCATION AND ITS IMPACT ON STUDENTS' PERFORMANCE IN BIOLOGY

(Senior Secondary Schools II Adamawa State, Nigeria)

A Thesis for the Degree of PhD

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بسم الله الرحمن الرحيم

قال تعالى:

﴿ إن في خلق السموات والأرض واختلاف الليل والنهار لآيات لأولى الألباب، الذين يذكرون الله قياما وقعودا وعلى جنوبهم ويتفكرون في خلق السموات والأرض ربنا ما خلقت هذا باطلا سبحانك وقنا عذاب ﴾

سورة آل عمران: 190-191

DECLARATION

I hereby declare that this thesis was written by me and it is a record of my own research work. It has not been presented before in any previous application for a higher degree. All references cited have been duly acknowledged.

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APPROVAL PAGE

This thesis entitled “Design and Implementation of Information Processing Model of Science and Technology Education and its Impact on Students’ Performance in Biology” meets the regulations governing the award of PhD Degree of the International University of Africa, Khartoum and it is approved for its contribution to knowledge and literary presentation.

_____	_____
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DEDICATION

This work is dedicated to those who have the greatest impact in my life: my beloved Prophet Muhammad (SAW), my parents (Late Alh. Ahmad wazirin Hashidu and Habiba).

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All praise are due to Allah. We praise Him, seek His help and His ask forgiveness. We seek refuge in Allah from the evil of our souls and the adverse consequences of our deeds. Whoever Allah guides there is none that can misguides him.

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ABSTRACT

The study concerns with design and implementation of information processing models of science and technology education in biology and its impact on secondary school students' academic achievement in biology in Adamawa state. Four models out of the seven information processing models were designed and implemented. Five objectives were set, five research questions and five hypotheses tested at 0.05 level of significance guided the study. The experimental design of the study was quasi-experimental pretest posttest non-equivalent control group design which involved 280 SSII students from five purposively selected senior secondary schools in Adamawa state. Instrument used for data collection was cognitive test tagged Biology Cognitive Test (BCT) adapted from WAEC past questions from 2010-2015. The instrument was content validated by three experts. The instrument was also tested for reliability, using split half method. The reliability coefficient of 0.78 was obtained. The treatment lasted for eight weeks. The data collected were analyzed using descriptive statistics for the research questions, t-test and Multivariate Analysis of Covariance (MANCOVA) for the hypotheses. The result revealed that, information processing models enhanced students' performance in biology. Furthermore, post-hoc analysis revealed that, biological science inquiry model group performed better than the remaining models and lecture method group. Recommendations made based on the findings are, information processing models should be incorporated in the teaching of biology in secondary schools, Adamawa state government and schools should organize workshops for practicing teachers to inculcate skills of information processing models.

مستخلص

تناولت الدراسة تصميم وتنفيذ نماذج معالجة المعلومات لتعليم العلوم والتكنولوجيا في علم الأحياء وتأثيرها على التحصيل الدراسي لطلاب المدارس الثانوية في علم الأحياء بولاية أداماوا . ثم تصميم وتنفيذ أربعة نماذج من نماذج معالجة المعلومات السبعة، ثم وضع خمسة أهداف ، وخمسة أسئلة بحث وخمس فرضيات ثم اختبارها في مستوى 0.05 من الأهمية التي استرشدت بها الدراسة، كان التصميم التجريبي للدراسة هو الاختباري التجريبي غير المكافئ الذي اشتمل على 280 طالبا للصف الثاني الثانوي من خمس مدارس ثانوية منتقاة بشكل مقصود في ولاية أداماوا . وقد كانت الأداة المستخدمة لجمع البيانات هي الاختبار المعرفي المسمى اختبار البيولوجيا الإدراكية (BCT) المأخوذ من أسئلة امتحانات (WAEC)للسنوات الماضية ما بين 2010-2015م،وكذلك تمت مراجعة الاختبار من قبل الخبراء في المجال ،ثم التحقق من صحة هذا الأدة أيضا من أجل الموثوقية باستخدام طريقة تقسيم النصف ، ثم الحصول على معامل الموثوقية 0.78. استمرت التجربة لمدة ثمانية أسابيع ، ثم تحليل البيانات التي تم جمعها باستخدام الإحصاء الوصفي لأسئلة البحث من التباين (MANCOVA) للفرضيات . وكشف النتيجة أن نماذج معالجة المعلومات عززت أداء الطلاب في علم الأحياء . علاوة على ذلك كشف التحليل اللاحق أن مجموعة نموذج البحث العلمي في البيولوجيا كان أداؤها أفضل من النماذج المتبقية ومجموعة أساليب المحاضرات . وكانت التوصيات المقدمة بناء على النتائج هي: يجب أن تدرج نماذج معالجة المعلومات في تدريس علم الأحياء في المدارس الثانوية ، يجب على حكومة ولاية أداماوا والمدارس تنظيم ورش عمل للمدرسين الممارسين لغرس مهارات نماذج معالجة المعلومات .

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